CLAIMS

What is claimed is:

1. A method for constructing a medical implant device, comprising:

forming a porous metal base;

depositing a corrosion barrier layer on said porous metal base, said deposition including laser based metal deposition (LBMD); and

depositing a layer comprising a bearing material onto said corrosion barrier layer using LBMD.

2. A method as in claim 1, wherein said porous metal base comprises a material selected from the group consisting of: cobalt-chrome, tantalum (Ta), titanium, stainless steel, and alloys thereof.

3. A method as in claim 1, wherein said corrosion barrier layer comprises titanium (Ti).

4. A method as in claim 1, wherein said corrosion barrier layer comprise an alloy including Ti.

5. A method as in claim 1, wherein said laser based metal deposition of said barrier layer includes applying said barrier layer as a foil and heating said foil with a laser.

6. A method as in claim 1, wherein said laser based metal deposition of said barrier layer includes applying said barrier layer as a powder and heating said powder with a laser.

Daniel F. Justin
REGISTERED PATENT AGENT
MedicineLodge. Inc.
180 South 600 West
Logan, UT 84321

7. A method as in claim 1, wherein said laser based metal deposition of said barrier layer includes applying said barrier layer as a wire.

8. A method as in claim 1 wherein said bearing material layer comprises of a Co-Cr layer comprising an alloy comprised of cobalt (Co) and chromium (Cr).

9. A method as in clam 8, wherein said alloy comprised of cobalt (Co) and chromium (Cr) is formed as a foil and heating said foil with a laser.

10. A method as in clam 8, wherein said alloy comprised of cobalt (Co) and chromium (Cr) is formed as a powder and heating said wire with a laser.

11. A method as in clam 8, wherein said alloy comprised of cobalt (Co) and chromium (Cr) is formed as a wire and heating said wire with a laser.

12. A method as in claim 8, wherein said laser based metal deposition of said corrosion barrier layer and said Co-Cr layer includes heating said corrosion barrier layer and said Co-Cr layer with a high power Nd YAG laser.

13. A method as in claim 8, wherein said (LBMD) heats said Co-Cr sufficiently to melt said Co-Cr and also allows said Co-Cr to cool sufficiently quickly to form a small grain structure in said Co-Cr thereby hardening said Co-Cr.

14. A method as in claim 8, wherein said (LBMD) heats said Co-Cr sufficiently to melt said Co-Cr and also allows said Co-Cr to cool sufficiently quickly to form carbon interspersions in said Co-Cr, thereby hardening said Co-Cr.

15. A method as in clam 1, wherein said base comprises Ti-6Al-4V.

16. A method as in claim 1, wherein said base comprises Ti or any alloy thereof.

Daniel F. Justin
REGISTERED PATENT AGENT
MedicineLodge. Inc.
180 South 600 West
Logan, UT 84321

17. A method as in claim 1, wherein at least one of said corrosion barrier layer and said bearing material is deposited in a plurality of layers having differing material properties to form a gradient of material properties.

Daniel F. Justin
REGISTERED PATENT AGENT
MedicineLodge. Inc.
180 South 600 West
Logan, UT 84321

18. A method for constructing a medical implant device, comprising:

forming a first structure including a porous base;

depositing a corrosion barrier layer on said porous metal base, said deposition including laser based metal deposition;

depositing a layer comprising Co and Cr (Co-Cr) onto said corrosion barrier layer using laser based metal deposition;

providing a second structure comprising Co-Cr; and bonding said deposited Co-Cr portion of said first structure onto said second structure.

19. A method as in claim 18, wherein said porous base comprises Ti or alloy thereof.

20. A method as in claim 18, wherein said porous base comprises Co-Cr or any alloy thereof.

21. A method as in claim 18, wherein said porous base comprises tantalum or any alloy thereof.

Daniel F. Justin
REGISTERED PATENT AGENT
MedicineLodge, Inc.
180 South 600 West
Logan, UT 84321

22. A medical implant device, comprising:

a porous metal base;

corrosion barrier layer formed on said porous metal base by laser based metal deposition (LBMD); and

a second layer formed on said corrosion barrier layer using LBMD, the second layer having a hardness greater than the porous metal base.

23. A device as in claim 22, wherein said porous metal base comprises a material selected from the group consisting of: Ta, Ti, stainless steel, and alloys thereof.

24. A device as in claim 22, wherein said corrosion barrier layer comprises Ti or alloys thereof.

25. A device as in claim 22, wherein said second layer comprises Co and Cr.

26. A device as in claim 22, wherein said porous metal base comprises Ta, said corrosion barrier layer comprises Ti or alloys thereof, and said second layer comprises Co and Cr.

27. A device as in claim 22, wherein said second layer is coupled to a second medical implant device.

Daniel F. Justin
REGISTERED PATENT AGENT
MedicineLodge. Inc.
180 South 600 West
Logan, UT 84321

28. A method for constructing a medical implant device, comprising:

forming a structure from a base metal;

depositing a second layer onto the surface of the base metal comprising a Co-Cr alloy bearing material using Laser Based Metal Deposition (LBMD).

29. A method as in claim 28, wherein said (LBMD) heats said Co-Cr bearing material sufficiently to melt said Co-Cr bearing material and also allows said Co-Cr bearing material to cool sufficiently quickly to form a small grain structure in said Co-Cr bearing material thereby hardening said Co-Cr bearing material.

30. A method as in claim 28, wherein said (LBMD) heats said Co-Cr sufficiently to melt said Co-Cr bearing material and also allows said Co-Cr bearing material to cool sufficiently quickly to form carbon interspersions in said Co-Cr bearing material, thereby hardening said Co-Cr bearing material.

Daniel F. Justin
REGISTERED PATENT AGENT
MedicineLodge. Inc.
180 South 600 West
Logan, UT 84321

31. A medical implant device, comprising:

a metal base structure;

second layer formed onto said metal base structure by Laser Based Metal Deposition (LBMD); the second layer comprising a Cobalt-Chrome based alloy having a hardness greater than the metal base structure.

32. A device as in claim 31, wherein said metal base structure comprises a material selected from the group consisting of: Cobalt-Chrome, Tantalum, Titanium, Platinum, stainless steel, and alloys thereof.

33. A device as in claim 31, wherein said second layer is coupled to a second medical implant device.

Daniel F. Justin
REGISTERED PATENT AGENT
MedicineLodge, Inc.
180 South 600 West
Logan, UT 84321